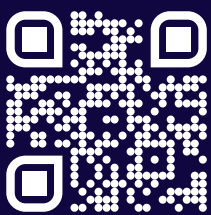


F-500EA

Fire Extinguishing Solutions

PYROX



pyroXfire.com

Ultimate protection against lithium-ion battery fires for marine, mining, vehicle and commercial sectors.



The Superior Technology of F-500 EA



F-500 EA is a high performance, multi-purpose and multi-class extinguishing agent with three-dimensional firefighting capabilities. It is completely fluorine-free & contains no PFOA or PFOS. Rapidly cools a fire and the surrounding structures, with the ability to absorb 6 to 10 times more heat energy than plain water. Encapsulates fuel vapor by forming micelles to simultaneously attack the fuel, heat and free radical legs of fire tetrahedron – resulting in rapid knockdown and extinguishment of fire, whilst minimizing smoke & soot.



Surface Tension Reduction

- Able to spread rapidly over fuel area and penetrate surfaces quickly
- Smaller droplets i.e. more surface area per volume of water



Rapid Cooling

- Thermally conducts heat into internal portion of water droplets
- Absorbs 6 to 10 times more heat through steam conversion



Fuel Encapsulation & Neutralization

- Formation of micelles around hydrocarbon fuel molecules
- Effectively surrounds & permanently neutralizes fuel & vapors



Interrupts Free Radical Chain Reaction

- Inhibits free radical chain reactions with fuel sources, resulting in easier fire extinguishment and coalescing of smoke & soot.

	Dry Chemical	Foam	Inert Gas	Wetting Agents	F-500 EA
Reduces Surface Tension		✓		✓	✓
Forms Foam Blanket		✓			✓
Rapid Cooling					✓
Prevent Reignition					✓
Toxin Reduction					✓
Effective & Practical					✓



Ordinary Combustibles



Flammable Liquids & Gases



Combustible Metals



Lithium-Ion Batteries

Fuel Fire Hazards

Fuel are highly combustible and have significant risk of explosion. This hazard is ever-present in the petrochemical industry, i.e. fuel spills, overturned tank trucks, fuel tank degassing & cleaning and pipeline devaporization.

F-500 EA vs Fuel Fires

01 F-500 EA reduces surface tension by saturating wet surface areas and increase penetration into fuel pores.

02 F-500 EA rapidly and permanently cools the fire, from 650°C to 53°C in seconds and allowing burnback resistance.

03 F-500 EA encapsulates hydrocarbon liquids & vapors, and renders materials non-flammable.

04 F-500 EA inhibits free radical coalescence, increasing visibility & air quality.



Lithium-Ion Battery Hazards

Li-ion batteries contain high energy densities and diverse materials. As such, Li-ion battery fire is multi-class and will emit toxic gasses & flammable electrolytes.

To protect against this hazard, fire protection must:

- ⊖ Suppress the Li-ion battery cell fire
- ⊖ Prevent thermal runaway & halt further ignition of neighboring cells
- ⊖ Cool the battery cells to stop heating
- ⊖ Help ensure safety of people in vicinity

How does Li-ion Fire Start?



Short Circuiting

Can become unstable & short circuit



Overcharging

Overcharging batteries can cause overheating



Trauma

Damages from impacts & collisions can cause it to become unstable



Overheating

High heat can lead to thermal runaway

F-500 EA vs Li-ion Fires

- 01 F-500 EA encapsulates the flammable electrolytes, rendering them non-flammable.
- 02 F-500 EA droplets rapidly reduce heat, stopping thermal runaway.
- 03 F-500 EA reduces toxic vapors, including fluoride gasses

Reference:

(1) Yuan, S., Chang, C., Zhang, J., Liu, Y., and Qian, X. (2022) "Experimental investigation of a micelle encapsulator F-500 on suppressing lithium-ion phosphate batteries fire and rapid cooling"



Rigorously Tested

1. KIWA (Dutch certification body) test no. 16120045 concluded that F-500 was better able to achieve suppression on lithium-ion batteries than standard powder or foam. It can reliably stop the spread of fire caused by thermal runaways and prevent reignition.

2. A research paper from Beijing Institute of Technology, China ⁽¹⁾ concluded that:

- ⊖ I. Stopping thermal runaway is the vital to rapidly extinguish Li-Ion battery fires,
- ⊖ II. The cooling effect plays the most significant role in extinguishing battery fires and preventing thermal runaway,
- ⊖ III. F-500 is highly effective due to its ability to rapid and permanent heat absorption. F500 3% solution's cooling is 3 times that of water mist.



Applications

- ✔ Lithium-Ion Batteries
 - EV Vehicles, Charging Stations, EV Showrooms
- ✔ Mining Vehicles & Equipment
- ✔ Flammable Fuel Spill Control
- ✔ Fuel Storage Tanks
- ✔ Electric Transformers
- ✔ Tyre Factories & Storage
- ✔ Rural Firefighting
- ✔ Three-Dimensional Fires
- ✔ Combustible Dust

EV Charging Stations

Solar Panels

Electric Buses

Battery Storage Farms

Mining Vehicles

Oil Storage Tanks

Marine Vessels

Tyre Fires



Delivery Systems

Fire Extinguishers

▶ 9 Litres

- ✔ Non-Corrosive
- ✔ Non-Toxic & Non-Skin Sensitizing
- ✔ Non-Hazardous
- ✔ Fully Biodegradable
- ✔ EPA NCP Product Schedule Listed

